



WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005PR20B

Title: Monitoring Nutrients Content in the San Juan Bay Estuary using Hyperspectral Remote Sensing

Project Type: Research

Focus Categories: Nutrients, Nitrate Contamination, Non Point Pollution

Keywords: Remote Sensing, Estuaries, Estuarine Modeling, Nutrients, Pollutants

Start Date: 03/01/2005

End Date: 02/28/2006

Federal Funds: \$20,000

Non-Federal Matching Funds: \$25,406

Congressional District:

Principal Investigator:

Fernando Gilbes

University of Puerto Rico at Mayaguez

Abstract

The San Juan Bay National Estuary System (SJBNES) is located in the northern coast of Puerto Rico contained within a drainage basin of 240 square kilometres. The estuary consists of the San Juan bay connected by a series of natural and dredged channels to four lagoons: Laguna del Condado, Laguna San José, Laguna La Torrecilla, and Laguna de Piñones. Point and non-point source water pollution is a potential threat to preserving the current environmental balance at the site and to the Atlantic Ocean, where the estuary discharges. Most of these pollution problems are associated with excessive nutrients loadings (i.e., nitrogen, ammonia, phosphorus) reaching the bay, particularly to the Laguna San José. Eutrophication conditions prevail at this site due to such excessive nutrients loadings. The use of satellite sensors, through remote sensing imaging techniques, is a state-of-the-art procedure currently used to assess environmental pollution problems around the world. Hyperion is a hyperspectral imaging sensor that could provide the necessary spatial and spectral resolution to monitor nutrients contamination at a complex land ecosystem such as the SJBNES. The objective of this project is to design and validate a mathematical algorithm, based on the reflectance characteristics of bacteria present in the nitrification process, to be used as a proxy for

nutrients contamination monitoring through the use of the Hyperion satellite sensor at the SJBNES. This research project will serve as the Doctor in Philosophy (Ph.D.) degree dissertation in Civil Engineering for Luis F. Campos.